

International Islamic University Chittagong (IIUC)
Department of Electronic & Telecommunications Engineering

Final examination

Program: B.Sc. Engineering
 Course Code: - ETE-3621/3641
 Full Marks-50

Semester- Autumn 2021
 Course Title:- Digital Communications
 Time- 2.30 Hours

[Answer any two questions from section-A & any three questions from section-B]
 [The figures in the right margin indicate full marks]

SECTION-A

- | | | | | |
|-----|---|---|----------|-----|
| Q1. | (a) Deduce the expression of normalized signal to quantization noise ratio in dB for any message signal is $(SNR)_{dB} = 4.8 + 6N$. | 5 | An | CO1 |
| | (b) Explain why quantization saturation and timing jitter occur and how it can be reduce. | 2 | An,
E | CO1 |
| | (c) A PCM system uses an uniform quantizer with 6-bit encoder. If the bit rate of the system is 50Mbps identify the message signal bandwidth and estimate output SNR when a 1MHz sinusoidal signal is applied to the input. | 3 | E | CO2 |
| Q2. | (a) Explain the companding? Briefly describe the μ -law and A-law companding characteristics. | 3 | An | CO1 |
| | (b) Briefly explain the ADM transmitter and receiver with proper diagram. | 5 | An | CO1 |
| | (c) Generate the Binary sequence for the following staircase information of fig: 1. | 2 | C | CO2 |

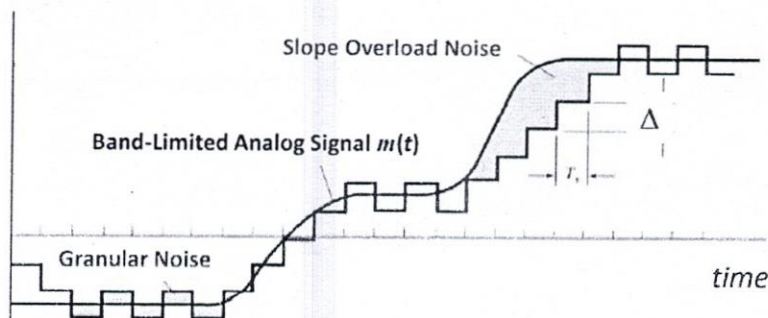


Fig:1

- | | | | | |
|-----|---|---|---|-----|
| Q3. | (a) Describe the properties of line coding. | 2 | U | CO2 |
| | (b) Construct the following line coding for the given binary sequence 1011000110. | 6 | C | CO2 |
| | i) Unipolar -RZ | | | |
| | ii) Polar | | | |
| | iii) Bipolar-RZ | | | |
| | iv) Manchester | | | |

- (c) Let us consider a message signal is input to the DM $v(t) = 5\sin(12000\pi t) + 10\sin(18000\pi t)$ volt. Evaluate the minimum sampling rate to avoid slope overload distortion if the step size is 0.564 volts. 2 E CO2

SECTION-B

- Q4. (a) Develop the waveform from the following constellation diagram mention in figure of binary sequence 011110001100. 10 C CO2

i) 4-PSK

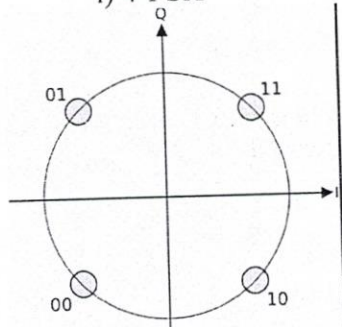


Fig:1 for i

ii) 8-QAM

iii) BFSK iv) DPSK

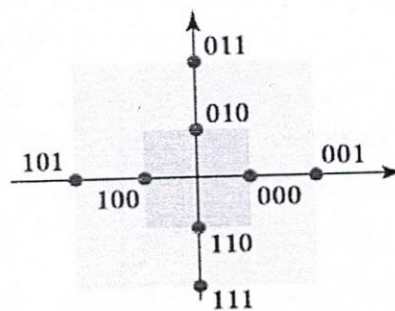


Fig:2 for ii

- Q5. (a) Express the equation of BER for ASK, FSK and PSK. 5 An CO1
 (b) Distinguish between coherent and non-coherent demodulation. 3 An CO1
 Consider two FSK signal with different frequency are given by $S_1(t) = 4\cos 200t$ and $S_2(t) = 2\cos 300t$. Estimate the bit error energy of the FSK signal. 2 E CO2
- Q6. (a) Distinguish between TDMA, FDMA and CDMA. 4 An CO1
 (b) Explain the necessity of rake receiver in cellular communication-Bangladesh perspective. 3 An, CO1
 (c) Explain the handoff and handover process in cellular communication system. 3 An CO1
- Q7. (a) Explain the importance of spread spectrum. 02 An CO1
 (b) Describe the operation of PSEUDO-noise sequence generator. 03 An CO1

- (c) Figure out the transmitted and received signal for DS-SS modulation technique for the following data shown in figure 3 with spreading code $T_b = \text{Your metric ID}$. As for example T193041=0111001, where assume $T=0$, Odd number=1, even number=0 and 0 will no change.

5 C CO2

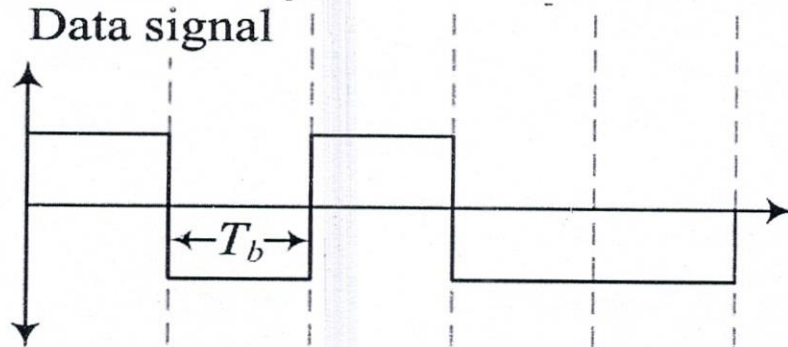


Fig:3